CENTURYLINK TEACHERS AND TECHNOLOGY GRANTS PROGRAM
COMPETITIVE SUB-GRANT PROPOSAL ASSURANCE SHEET

Project Title: SolidWorks in the Classroom Amount of Request: $ 1900

Name of Certificated Teacher (or "lead teacher" if more than one): James Dent

Name of School currently teaching at: Sage International School of Boise - Middle and High School

District Name: Sage International School of Boise District Number: 475

Total number of teachers involved (if more than one): 2 Grade level(s) impacted: 6th - 12th

Please list other teachers involved if this is a team application: Guy Falconer

Content area(s) impacted: Design Technology

I certify that if I receive a CenturyLink Teachers and Technology Program Grant –

1. I agree to create a 5-minute video highlighting my project for the purposes of sharing best practices with other Idaho PreK-12 teachers.
2. I agree to do one presentation on my project to other Idaho PreK-12 teachers before December 31, 2015 (by 5 pm MST).
3. I agree to submit an electronic report to the Idaho State Department of Education on or before December 31, 2015.

SUPERINTENDENT NAME (PRINT) Don Keller	E-MAIL mr.keller@sageinternationalschool.org	TELEPHONE 208.343.7243
SIGNATURE Don Keller		
PRINCIPAL NAME (PRINT) Melissa Hegg	E-MAIL melissa.hegg@sageinternationalschool.org	TELEPHONE 208.343.7243
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TEACHER OR LEAD TEACHER NAME (PRINT) James Dent	E-MAIL jim.dent@sageinternationalschool.org	TELEPHONE 570.772.6750
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TECHNOLOGY DIRECTOR (PRINT) Joe Temple	E-MAIL joe.temple@sageinternationalschool.org	TELEPHONE 208.343.7243
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CenturyLink Teachers and Technology Grants Program
Applicant certification

As an applicant for a CenturyLink Teachers and Technology Grant, you are required to certify the following statements. Please ensure that you work with the necessary individuals within your school or district to ensure that the following statements are accurate.

1. 1. After reasonable investigation (such as conferring with the school's network administrator), the applicant does not anticipate that the proposal, if selected for award, would significantly increase the school's network capacity needs.

[signature]	Melissa Hegg
Signature of applicant	Signature of principal
1/2/14	1/2/14
Date	Date

1. 2. The applicant is not involved in any procurement decisions regarding the purchase of the school's telecommunications and internet services, including its participation, if any, in the E-Rate program.

[signature]	Melissa Hegg
Signature of applicant	Signature of principal
1/2/14	1/2/14
Date	Date

1. 3. The applicant confirms that receiving this grant will have no impact on and will not be considered in E-rate procurement decisions for their school or school district.

[signature]	Melissa Hegg
Signature of applicant	Signature of principal
1/2/14	1/2/14
Date	Date

Applicant's Name (please print): James Dent

City and State: Boise, Idaho

School Name: Sage International School of Boise - Middle and High Schools
School District: Sage International School of Boise

Current Innovation:

Our school recognizes that STEM education is an important part of our student's educational experience. We are an International Baccalaureate school that currently offers STEM education through our Design Technology, Science, Math and other programs to students in grades K-11. Next year we will offer these classes to students in grades K-12.

The importance of STEM education to students at a young age has shown to have tremendous benefit to a student's overall development. We have made a very serious commitment to developing STEM education for all students as much as possible.

The author of this grant is a teacher in the Design Technology (DT) program at our school. The DT program has expanded again this year with the hiring of a new instructor and now provides students with a required DT class in grades 4 and up. Our students are given instruction in topics such as measurement, drafting, simple machines, fabrication, design, typing, coding and basic computer skills as early as 4th grade. Our program builds on these topics yearly until the students complete a culminating project at the end of 10th grade. After this, students may select the IB Diploma Program (DP) of their choosing for 11th and 12th grades. Currently, the DT pathway of the DP is the most popular at our school.

At the end of 10th grade, students will use the skills and knowledge they have been developing in DT to create a Tiny Home. These houses are usually about 600 square feet or less and provide all of the necessary accommodations found in a normal home. These houses are usually for one or two people, are very affordable and require very innovative design-oriented thinking. Our school plans on teaming up with our city in the near future to use these homes to provide shelter for our homeless population.

This project requires students to apply all of the skills they have been practicing in our classes. They must create and design the entire structure, develop budgets and materials lists, do all of the necessary fabrication and assembly, create a website that monitors their progress as well as promotes their project, and apply innovation and problem solving skills throughout.

The Tiny Home is an excellent capstone to the many skills presented in DT but we still plan to expand our program even further in the next few years. This grant focuses on SolidWorks, a valuable addition to our Design Technology program that will reach across all areas of STEM education for students in grades 6-12.

SolidWorks is an excellent resource that we will use to broaden our abilities as a program and expand the educational opportunities we provide our students. With SolidWorks, our students will be using state-of-the-art design software that allows them to plan, create, experiment and problem solve in a variety of settings. This software allows our entire DT program to extend our capabilities even further and provide our students with a more thorough understanding of the design process. SolidWorks presents a large variety of drafting scenarios, from very basic to very complex, and allow the user to build upon their skills at each level. The Design aspect of our DT program will be centered around this teaching tool and it will be used all the way through our program, from first learning to draw to creating plans and parts for our very own Tiny Homes.

On top of this project, our 10th graders will also be ready to take the Certified SolidWorks Associate exam (CSWA). This test certifies that they are skilled in many of the advanced areas of 3D Design software. This software has proven itself as an outstanding teaching tool for students in the middle and high school levels. It is accessible enough that they can grasp basic concepts quickly but advanced enough that they can continually stretch their skills and abilities. Students have not only shown that they learn more about design and innovation with SolidWorks but they also gain valuable skills used in many industries around the world today.

Project Narrative:

SolidWorks is a 3D Computer-Aided Design & Drafting program (CADD) that is used in many industries around the world. The variety of CADD options available in this one program allow students to explore industries like architectural, aerospace, construction, manufacturing, automotive, medical and more. Students who use this program are using the exact same systems that run in many different design firms throughout the world.

When using SolidWorks, students will begin with basic geometric shapes and build them into advanced 3D models. These models can be moved around, rotated, cross-sectioned, assembled with other parts, animated and even put through testing applications and analyzed. On top of all of this, students can then create a professional set of working drawings for their project. This entire program is very engaging and encourages STEM-focused learning from the first moment they learn how to draw a circle or square until they have created a real-life object and appropriate drawings.

SolidWorks will be used in grades 7-11 this year but will be worked into the full Middle Years and Diploma Programmes in grades 6-12 by next year. SolidWorks is the best teaching tool available to help students understand the world of Design and get hands-on, inquiry-based, real-world practice in this discipline.

The benefits of this type of program for students include the rehearsal, development and application of many 21st century skills including; critical thinking and problem solving, systems thinking, working and thinking creatively, working collaboratively, innovation and implementation, cross-disciplinary thinking, and literacy in the visual, scientific, numeric, media, information, computer & technology, and environmental disciplines. SolidWorks also offers students a great opportunity to practice career skills that are essential to working in a Design related occupation such as managing deadlines, project management, flexibility, leadership and working independently as well as in teams.

Students are intrigued and motivated when they are able to make real-world connections to their work. If a student can see that SolidWorks has a place in the world of Design then they are more likely to stay interested and see value in the lessons. Having a real-world application makes every lesson more meaningful for the student.

On top of all of this, SolidWorks is "fun" for many students. It is an exciting challenge, an impressive program, very high-tech and leaves our kids full of questions. This kind of product only helps improve the classroom environment and our overall school climate.

This software will be used by two Design Technology teachers in our school in multiple classes. Our program will implement SolidWorks in 7th grade but focus on in more intensely in grades 8-12. Both DT teachers are skilled in the design fields and capable of providing high level instruction with this software.

The feasibility of this project is quite simple. Our district is currently divided between two locations, each of which contains a computer lab specifically for DT. These computers can be loaded with the necessary software and will provide plenty of seats for all students to get the necessary access to the program. At the start of our 2016-2017 school year, we will have consolidated to one large building, allowing our district to use resources even more efficiently.

The author of this grant recently moved from a different school district where he taught CADD classes and used SolidWorks for about 7 years. During that time, students were engaged in creating real objects, manipulating and analyzing those projects, creating working drawings and, most recently, 3D printing their projects. The sustainability of this program has been clearly demonstrated throughout these 7 years and only shows signs of intensifying in the future. SolidWorks is an excellent program and more and more design industries are using it

every year. Students in past classes have even commented that the first day at their new design job felt like they were right back in the classroom, doing the same type of work with the exact same program.

This project has been evaluated and approved by our district including our Executive Director (Superintendent), Principal and IT Specialist.

Project Scope and Sequence:

Basic Design concepts are introduced to our students in the 4th grade. These include practice with measurements and using precise geometric shapes to create working drawings. As students continue through the DT program these concepts are expanded upon. In 5th grade, students create more complex drawings and are introduced to concepts such as line weight and 3D spatial relationships. In 6th grade, at the beginning of our Middle Years Program, our students start their first advanced design work. Students are required to continually practice concepts like measurement and line weight but are also introduced to the concepts of scale and orthographic projection. Students will create very precise hand-drawn sets of drawings and follow this with their first lessons using 3D Design software. These lessons are often experimental and less structured but allow our students a chance to see how the skills they previously learned on paper can be transferred into a virtual 3D environment. Our 7th grade students work exclusively with 3D Design software, including SolidWorks and other programs. These programs are used to reinforce and build on previous knowledge. Once our students reach 8th grade they will be working almost exclusively with SolidWorks in our Design studio. Between 8th and 12th grade we work with our students to develop 3D models and working drawings of many different types of objects including architectural, construction, manufacturing and electrical designs. We break our lessons into one of five different categories: 1) Basic Theory and Drawing Theory, 2) Part Modeling, 3) Assembly Modeling, 4) Advanced Part Modeling and Analysis, and 5) Creating Engineering Drawings.

By the end of 10th grade, our students will create complex models and drawings as a part of the Tiny Home project. These designs are then used to help create and construct our Tiny Homes as well as evaluate its overall effectiveness. Students will be combining all of their previous knowledge into developing the Tiny Home and all necessary components of design and production. They will also be completing the CSWA exam in 10th grade.

When a student starts 11th grade in our school, they have the choice to go into the Diploma Programme. Our school offers a few different pathways and students who choose the DT pathway will use SoildWorks to further advance their design, drafting and critical thinking skills. By the time a student graduates from our school, they can have a very advanced understanding of the Design fields, have their CSWA certification, have designed and constructed a project as advanced as a Tiny Home and an IB Diploma preparing them for many future educational opportunities.

The effectiveness of this grant will be judged by the results our students produce. We have set high goals for our students in our Design classes and will use SolidWorks to achieve these goals. Every year, we will be reinforcing Design concepts with younger students so we expect to see exponential growth in our students' abilities for years to come. As our students grow, we plan to expand our program and our goals each year.

The diversity of the SolidWorks program allows for a variety of assessment methods. Because this program simulates real-world production of design and products, assessments can be handled in a very realistic manner. Students can submit drawings, parts, assemblies or even 3D printed models of their projects for evaluation. Students can also explore deep into the software to create test models that will evaluate the effectiveness of parts as they are tested

over time. The user is able to virtually change the types of materials as well as other testing factors to produce different results for evaluation. Once these data are collected, students are able to compile a full report and prepare it for display or presentation. In the end, a student can create a full working model, set of drawings, report and presentation about their project in a very similar fashion to real-world applications.

There are many other aspects covered throughout the DT program in grades 4-12. We have designed a program that compliments itself as well as other district curricula, specifically STEM oriented programs. You will find a complete Scope and Sequence document for our DT program attached. This is a working document and is always being modified but the foundations and concepts found therein are consistent with our program and district vision.

Budget Narrative and Spreadsheet:

We are very fortunate to have received a generous donation from ECCO Safety Group, a local Boise company, to help offset our costs last year. They covered half of the overall costs which left us with $1900 to cover. While ECCO did not make a financial contribution this year, they are sending us two engineers to help us understand and teach the program. Because of this, our supplier, Northwest Tech Inc, reduced our costs so that they are the same as last year - $1900. This includes 45 licenses (which also allows our students to use the program from home) and access to the Certified SolidWorks Associate (CSWA) exam. This will fully outfit our 6-12 grade MYP and DP programs and allow our students to take the CSWA in 10th grade.

A copy of the quote we received is pasted below:

SolidWorks Lab Pack $ 1,900.00

Includes:
45 Licenses
Student Access level 1, 365 day download to use at home
CSWA certification testing
SolidWorks
Lab/Class Packs
(1 Year Subscription Included)

SolidWorks Lab Pack (1 Year Subscription)	45 Licenses	$1900
	Total Costs:	**$1900**